

1 WHAT IS CLAIMED:

- 2 1. A method for making a multi-pass heat exchanger core comprising
3 the steps of:
4 providing at least one coolant plenum for containing flowing
5 coolant;
6 installing adjacent to the at least one coolant plenum at least one
7 first-pass plenum for containing a flowing heated fluid and defining a first area-in-
8 flow of the heated fluid; and
9 disposing adjacent to the at least one coolant plenum at least one
10 subsequent-pass plenum for containing the heated fluid and defining a second
11 area-in-flow of the heated fluid; and
12 arranging the plenums so that the contained heated fluid flows past
13 a coolant plenum at least twice;
14 wherein the step of defining a first area-in-flow comprises defining a first area-in-
15 flow which substantially exceeds the second area-in-flow.
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- 17 2. The method of claim 1 wherein:
18 the step of providing at least one coolant plenum comprises
19 providing a plurality of coolant plenums;
20 the step of installing at least one first-pass plenum comprises
21 installing a plurality of first-pass plenums;
22 the step of disposing at least one subsequent-pass plenum comprises
23 disposing a plurality of subsequent-pass plenums; and
24 further comprising the step of arranging the first-pass plenums and the
25 subsequent-pass plenums in an alternating manner between cooling plenums,
26 every second plenum being a cooling plenum.
27
- 28 3. The method of claim 1 further comprising the steps of:

1 defining a first plurality of exhaust passages in each of the first-pass
2 plenums to direct exhaust gases through the first-pass plenums; and
3 defining a second plurality of exhaust passages in each of the
4 subsequent-pass plenums to direct exhaust gases through the subsequent-pass
5 plenums;
6 wherein the exhaust passages in each first-pass plenum substantially exceed in
7 number the exhaust passages in each subsequent-pass plenum.

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9 4. A method for making a multi-pass exhaust gas recirculation cooler
10 comprising the steps of:
11 providing a plurality of coolant plenums for containing flowing
12 coolant;
13 disposing adjacent to at least one of the coolant plenums a plurality
14 of first-pass plenums for containing hot exhaust gases;
15 disposing adjacent to at least one of the coolant plenums a plurality
16 of subsequent-pass plenums for containing the hot exhaust gases;
17 defining a plurality of exhaust passages in each of the first-pass
18 plenums; and
19 defining a plurality of exhaust gas passages in each the subsequent-
20 pass plenums, wherein the exhaust gas passages have substantially equal radial
21 cross sectional areas, and the total number of exhaust passages in the plurality of
22 first-pass plenums substantially exceeds the total number of exhaust passages in
23 the plurality of subsequent-pass plenums.

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25 5. The method of claim 4 comprising the further steps of:
26 disposing all the plenums substantially parallel; and
27 separating the first-pass plenums from the subsequent-pass plenums
28 with at least one elongate divider substantially perpendicular to the plenums.
29

- 1 6. The method of claim 4 comprising the further steps of:
- 2 disposing all the plenums substantially parallel; and
- 3 separating the first-pass plenums from the subsequent-pass plenums
- 4 with at least one elongated divider parallel to the plenums.
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